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THE ACHILLES' HEEL OF BREEDING CHEETAHS

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Two zoos, both having bred cheetahs (*Acinonyx jubatus*) successfully for many years, experienced calcaneus fractures in several cubs for the first time. In previous years, temporary lameness, defective position and even fractures occurred in the front limbs of 3 to 5 months old cheetahs. These cases correlated with an unbalanced diet of meat only suspecting Metabolic Bone Disease (MBD). This case report from two different zoos describes these fractures and discusses the practical problems associated to feeding and possible methods of prophylaxis and treatment of MBD in cheetahs.

Complete carcass feeding with small mammals and poultry play an important role in the nutrition of adult cheetahs. Usually the portion of complete animals in the ration of young cheetahs is even higher. Additionally meat of large mammals is fed to cheetahs. Several times a week raw meat is dusted with a mineral supplement for carnivores. In our cases unfavourable changes (more meat and less complete carcasses due to a shortage of feed animals) in the practical feeding of the young cheetahs led to a suboptimal diet.

The causes for MBD are a lack of vitamin D, which causes the genuine rickets, a lack of calcium and/or a poor calcium-phosphorus ratio. In young cheetahs the enteral absorption of calcium as well as the incorporation of calcium into the bones is independent of vitamin D. Mineral supplements for big cats contain high levels of vitamin D (e.g. Carnivore Supplement (Mazuri®, St.Louis, USA): 225 IU/g). For this reason, minimal amounts should be sufficient and a lack of vitamin D as the reason for rickets seems unlikely. In these cases feeding mainly meat causes an inappropriate calcium-phosphor ratio as well as an absolute lack of calcium which leads to depletion of calcium from the bones via the parathyroid hormone path (All Meat Syndrome). Additionally feeding of mineral supplements cannot compensate for the lack of calcium because the animals are not able to ingest the huge amounts of calcium required (> 40 g of calcium carbonate per kg meat). Only the regular feeding of complete small mammals or adult chickens assures the adequate supply of calcium whilst the livers of the feed animals provide the sufficient amount of vitamin A and D. It is essential to adapt the feeding plan to the amount of calcium as well as to the energy requirements because excessive energy amounts result in an increased secretion of the hormones insulin, growth hormone and IGF-1, and this eventually leads to MBD.

The method of choice in treating fresh calcaneus fractures is osteosynthesis with pins and tension banding. Conservative methods usually fail due to the tendon traction of the hamstring which prevents the bones from healing. In both cases in Nuremberg surgery was possible and after removing the implants 3.5 months later the cats were free of lameness. In Ebeltoft, the calcaneus fracture was diagnosed a couple of days after it had occurred and due to contracture surgery was not possible anymore. The fracture healed without surgical treatment through cage rest and only a slight lameness remained.

Complete carcass feeding of chickens and/or small mammals seems essential for a successful upbringing of cheetahs. Even without any supplementation no deficits are likely to happen, if the feeding animals are sufficiently supplemented themselves and enough of these are provided to the growing cheetahs.